UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

SUPPORTING AMENDMENT NO. 43 TO PROVISIONAL OPERATING LICENSE NO. DPR-16

JERSEY CENTRAL POWER & LIGHT COMPANY

OYSTER CREEK NUCLEAR GENERATING STATION, UNIT NO. 1

DOCKET NO. 50-219

1.0 INTRODUCTION

By letter dated November 16, 1979, Jersey Central Power & Light Company (JCP&L)(the licensee) requested changes to the Technical Specifications of Provisional Operating License No. DPR-16. The changes to the Technical Specifications would allow the core to be unloaded and reloaded without control rod blade guides for each control rod and would also allow multiple control rod drive maintenance activities. Unloading and transfer of all the fuel assemblies in the Oyster Creek reactor vessel to the spent fuel pool storage facility will allow maintenance operations to be performed on the reactor vessel or the suppression chamber. Modifications similar to the proposed changes have been accepted previously for Cycles 6 and 7 (our letter to JCP&L dated March 31, 1977).

2.0 EVALUATION

2.1 Core Criticality

Defueling and subsequent refueling leads to unusual core configurations. The reasons for this are (1) relatively few blade guides (used to provide lateral support to the control blade in a defueled cell) are available and (2) the licensee desires to use the installed startup range monitors (SRM's), rather than dunking chambers, i.e., waterproof core chambers temporarily inserted into the reactor vessel, to monitor the core during alterations. The SRMs must be within the configuration of fuel assemblies remaining in the core to be effective.

The order of fuel assembly removal leads to configurations with moderator-filled cavities (cells from which both fuel and the control blade have been removed) in the core. The increased moderation in a defueled cell alters the worths of that cell's control blade and also the neighboring control blades. The question of safety significance for such configurations is: will the negative reactivity introduced by removing the four fuel assemblies be greater than the positive reactivity introduced by removing the associated

control blade? The present technical specifications require a reactivity shutdown design margin so that the core is at least 1.00% subcritical with the highest worth control blade withdrawn and all other control blades fully inserted. In this evaluation the highest worth control blade is assumed to be withdrawn in addition to the control blade removed from the adjacent defueled cell.

To evaluate the effect on shutdown margin, the licensee has performed PDQ computer code calculations for various configurations. Each configuration was calculated for a "nominal" case, where all assemblies were at 10,000 MWD/t burnup, and for a "conservative" case, where the exposures of the assemblies surrounding the high worth rod were reduced to increase the reactivity worth of the rod. The four configurations studied were:

Fully loaded core,	All rods in.
Fully loaded core,	Hot rod out.
Adjacent cell defueled,	All rods in, except rod in defueled cell.
Adjacent cell defueled,	Hot rod out, rod in defueled cell out.

The net results indicate an increase of 1.78% in the shutdown margin for the conservative case (2.78% shutdown margin compared to 1% for the as designed core) when the cell adjacent to the highest worth control blade is defueled and that cell's blade is removed.

Control rod worths calculated in the "nominal" case agree well with actual rod worths observed in the Oyster Creek reactor. Added assurance is thereby provided that the calculations are conservative and therefore acceptable.

The proposed specifications require an evaluation "for each refuel/reload to ensure that actual core criticality for the proposed order or defueling and refueling is bounded by previous analysis . . ." or an analysis shall be performed to ". . . show that sufficient conservativism exists for the proposed order of defueling and refueling before such operation shall be allowed to proceed."

Since the results of the analyses indicate adequate shutdown margin and the requirement for future evaluation will ensure that sufficient shutdown margin is maintained, we find the proposed specification changes relating to criticality acceptable.

2.2 Control Rod Withdrawal Interlocks

Refueling interlocks are provided as procedural backup to prevent the addition of reactivity to the core that could result in unplanned criticality. When in the REFUEL mode, refueling interlocks, in addition to other functions, prevent withdrawal of more than one control rod and under certain conditions prevent withdrawal (removal) of any control rods. We have concluded in the preceding section, based on PDQ calculated results, that when the four fuel assemblies in core positions adjacent to a control rod are removed, the reactivity withdrawn is greater than the reactivity inserted when the control rod associated with the four fuel assemblies is withdrawn. In other words the shutdown reactivity margin is greater, and the core is less reactive. Therefore, we have also concluded that the proposed Technical Specification changes to allow bypassing of refueling interlocks for a selected control rod after the four adjacent fuel assemblies have been withdrawn are acceptable.

2.3 Control Rod Interlock Bypass Error

If the interlock on a control rod is unintentionally bypassed (i.e., the wrong control rod interlock is removed after the fuel and control rod have been withdrawn from a cell), the mistake will be evident as soon as an attempt is made to remove another fuel assembly or control rod from the core. Refueling interlocks will block such action until the mistake is corrected. On this basis we have concluded that the proposed changes to the Technical Specifications are acceptable.

2.4 Refueling Accident

According to the FDSAR the reactor core is designed so that is remains subcritical with one of the control rods fully withdrawn even if it is assumed that a fuel assembly is dropped into a empty fuel space in an otherwise fully constituted core. The control rod withdrawal interlock system reinforces administrative procedures to assure that such an unplanned criticality is never achieved. We have concluded that the proposed Technical Specification changes to allow core defueling and reloading do not introduce the potential for accidents that have not been previously evaluated and approved. On this basis the potential for unplanned core criticality during the unloading and reloading of fuel assemblies is not changed significantly and the proposed Technical Specification changes are therefore acceptable.

The potential for unplanned criticality in the spent fuel pool has been reexamined because of the planned increase in fuel pool storage capacity (refer to Amendment No. 22 dated March 30, 1977) and found to be acceptably low because the neutron multiplication factor, K_{eff}, is less than the NRC acceptance criteria of 0.95.

We have therefore concluded that the proposed Technical Specification changes related to unloading and reloading the core considering storage of the off-loaded fuel in the spent fuel pool are acceptable.

3.0 ENVIRONMENTAL CONSIDERATIONS

We have determined that this amendment does not authorize a change in effluent types or total amounts nor an increase in power level and will not result in any significant environmental impact. Having made this determination, we have further concluded that the amendment involves an action which is insignificant from the standpoint of environmental impact and pursuant to 10 CFR §51.5(d)(4) that an environmental impact statement, or negative declaration and environmental impact appraisal need not be prepared in connection with the issuance of this amendment.

4.0 CONCLUSION

We have concluded, based on the considerations discussed above, that: (1) because the amendment does not involve a significant increase in the probability or consequences of accidents previously considered and does not involve a significant decrease in a safety margin, the amendment does not involve a significant hazards consideration, (2) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, and (3) such activities will be conducted in compliance with the Commission's regulations and the issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public.

Date: January 4, 1980